# Exercise Solutions for Math 20

Radicals and Complex Numbers

Nile Jocson <novoseiversia@gmail.com>

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# 1 Simplify the following. Rationalize the denominators.

## 1.1 $\frac{24c^{-\frac{1}{2}}d^{\frac{2}{3}}}{18c^{-\frac{1}{7}}d^{-\frac{3}{5}}}$

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|---|---|
| $\Rightarrow \frac{4c^{-\frac{1}{2}}d^{\frac{2}{3}}}{3c^{-\frac{1}{7}}d^{-\frac{3}{5}}}$ | Simplify the fraction to lowest terms. |
| $\Rightarrow \frac{4d^{\frac{2}{3}}c^{\frac{1}{7}}d^{\frac{3}{5}}}{3c^{\frac{1}{2}}}$ | $a^{-\frac{b}{c}} = \frac{1}{a^{\frac{b}{c}}}$ |
| $\Rightarrow \frac{4d^{\frac{2}{3}}d^{\frac{3}{5}}}{3}c^{\frac{1}{7}-\frac{1}{2}}$ | $\frac{a^m}{a^n} = a^{m-n}$ |
| $\Rightarrow \frac{4d^{\frac{2}{3}}d^{\frac{3}{5}}}{3}c^{\frac{2}{14}-\frac{7}{14}}$<br>$\Rightarrow \frac{4d^{\frac{2}{3}}d^{\frac{3}{5}}}{3}c^{-\frac{5}{14}}$ | LCM = 14 |
| $\Rightarrow \frac{4}{3}c^{-\frac{5}{14}}d^{\frac{2}{3}+\frac{3}{5}}$ | $a^m a^n = a^{m+n}$ |
| $\Rightarrow \frac{4}{3}c^{-\frac{5}{14}}d^{\frac{10}{15}+\frac{9}{15}}$<br>$\Rightarrow \frac{4}{3}c^{-\frac{5}{14}}d^{\frac{19}{15}}$ | LCM = 15 |
| $\Rightarrow \frac{4d^{\frac{19}{15}}}{3c^{\frac{5}{14}}}$ | $a^{-\frac{b}{c}} = \frac{1}{a^{\frac{b}{c}}}$ |
| $\Rightarrow \frac{4\sqrt[15]{d^{19}}}{3\sqrt[14]{c^5}}$ | Convert to roots. |
| $\Rightarrow \frac{4\sqrt[15]{d^{19}}}{3\sqrt[14]{c^5}} \cdot \frac{\sqrt[14]{c^9}}{\sqrt[14]{c^9}}$<br>$\Rightarrow \frac{4\sqrt[14]{c^9}\sqrt[15]{d^{19}}}{3c}$ | Rationalize. |
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